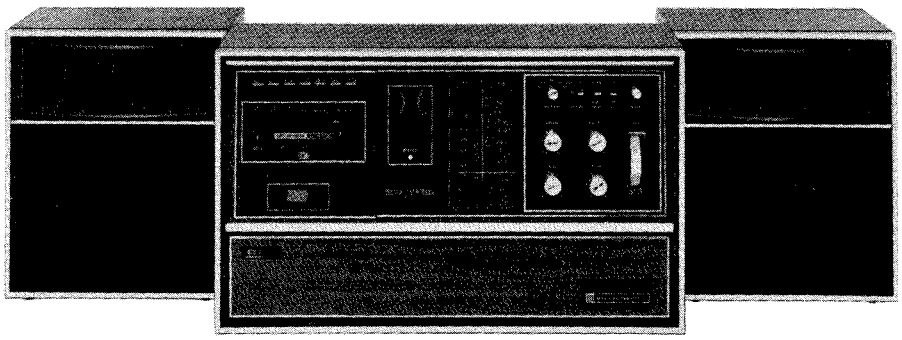
Service Manual

NATIONAL
TAPE RECORDER
PANASONIC

DELUXE STEREO CASSETTE WITH AUTOMATIC REVERSE SYSTEM AND BUILT-IN FM/AM/FM STEREO RADIO



RS-272US MECHANISM SERIES

RS-282S

SPECIFICATIONS

Power Source:	AC: 90~109, 110~125, 200~219, 220~250 volts; 50/60 Hz
Power Consumption:	Approx. 35 watt
Motor:	Mechanical governor motor
Maximum Output:	Approx. 20 watt (PMPO) (10×2)
Transistors:	2SK33(1) 2SC920R(6) 2SC710C(4) 2SB178(1) 2SB348(2) 2SB175B(4) 2SA564(2) 2SB346(4) 2SB473(5) 2SC945R(3)
Diodes:	SC15(1) KB265A(1) OA90Z(2) 20A90Z(6) OA90(5) 1S1211(3) FR204(4) SD1Y(1)
Rectifier:	SIB0201B(1)
Recording System:	AC bias 30 kHz, AC erase
Track System:	4-track, 2-channel stereo
Tape Speed:	1-7/8 ips
Fast Forward Time:	Approx. 100 seconds with C-60 cassette
Rewind Time:	Approx. 100 seconds with C-60 cassette
Frequency Response:	30~12,000 Hz
Inputs:	2 "MIC" −80 dB 200Ω~3 kΩ 2 "AUX" −30 dB 180 kΩ 2 "PHONO" −20 dB 800 kΩ
Outputs:	2 "LINE OUT" 4 kΩ 2 "EXT SP" 8Ω 1 "HEADPHONE" 8Ω
Recording Time:	One hour (two-way, using C-60 cassette)
Speakers:	2 - 6-1/2" PM dynamic speaker 2 - 2-3/4" PM dynamic speaker
Dimensions:	
(main body)	21-1/4"(W)×13-1/4"(H)×6-5/8"(D)
(each speaker box)	10-5/8"(W)×13-1/4"(H)×7"(D)
Weight:	
(main body)	25-1/4 lbs.
(each speaker box)	6-1/2 lbs.

—AUDIO SECTION—

Frequency Response:	20~25,000 Hz
Bass Control:	±10 dB at 100 Hz
Treble Control:	±10 dB at 15 kHz

—RADIO SECTION—

Frequency Range:	AM: 525~1,605 kHz FM: 87.5~108 MHz
Intermediate Frequency:	AM: 455 kHz FM: 10.7 MHz
Sensitivity:	AM: 60μV/m/50 mV FM: 3μV/50 mW

These specifications are subject to change in order to accommodate improvements in design.

MATSUSHITA ELECTRIC
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288 Central, Osaka, Japan

ORDER NO. ARD-7111202

LOCATION OF PARTS

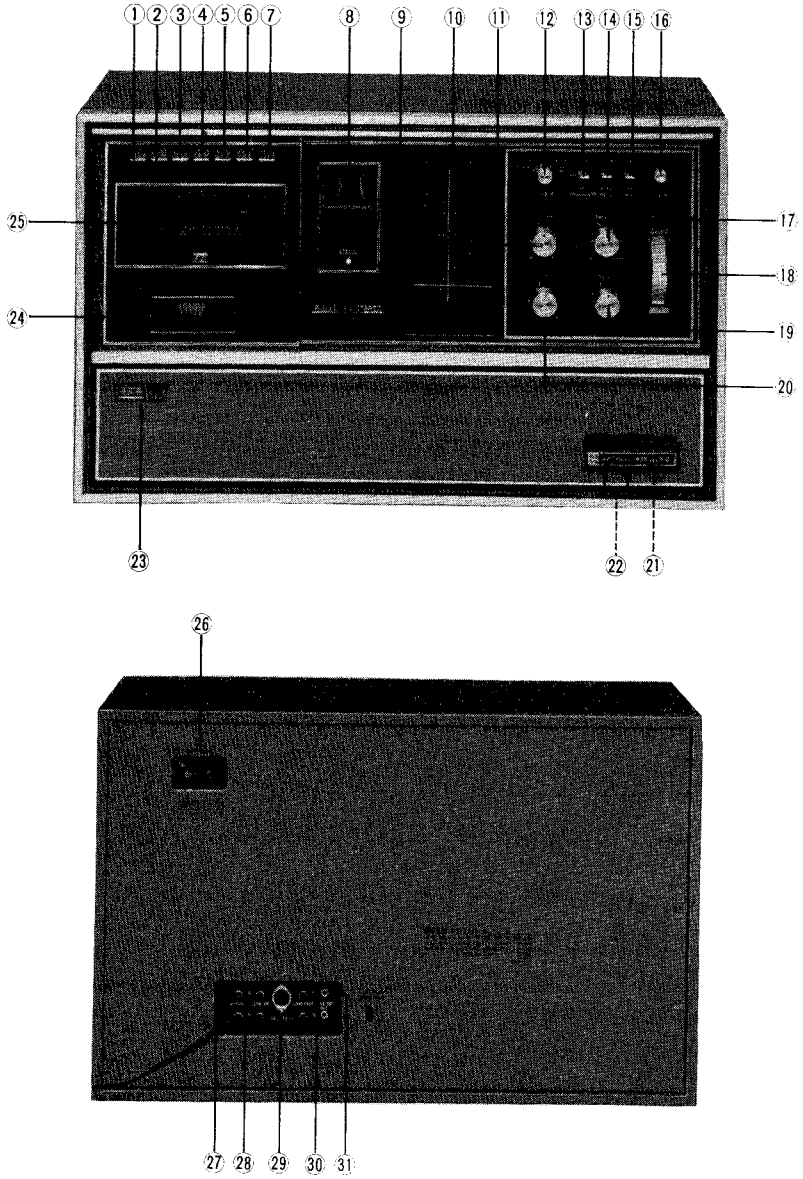


Fig. 1

① Stop button
② Fast forward button
③ Playback button
④ Rewind button
⑤ Record button
⑥ Direction button (Forward)
⑦ Direction button (Reverse)
⑧ VU meter
⑨ FM stereo eye
⑩ Radio dial scale
⑪ Volume control
⑫ Program selector
⑬ Speaker monitor switch
⑭ Stereo/mono selector
⑮ AFC switch
⑯ Power switch
⑰ Balance control
⑱ Tuning control
⑲ Treble control
⑳ Bass control
㉑ Headphone jack
㉒ Microphone jacks
㉓ Tape counter
㉔ Cassette lid
㉕ Ejection button
㉖ FM antenna input terminal
㉗ Phono jacks
㉘ Auxiliary input jacks
㉙ Record/playback connector
㉚ Line output jacks
㉛ External speaker jacks

STANDARD VALUE TO BE ADJUSTED

ITEM	VALUE	PARTS TO BE ADJUSTED	REMARKS
Recording bias current.	0.56 mA	L11 (CH1) L12 (CH2)	Set the volume control to minimum.
Input level.	MIC −81±4 dB AUX IN −30±3 dB	VR9 (CH1) VR10 (CH2) (Refer to fig. 11)	To obtain 50±10μA of recording current through the recording head. Set the volume control to maximum.
Bias oscillation frequency.	30±10 kHz	——	——
Erase current.	110±10 mA	VR11 (Refer to fig. 10)	——
Takeup tension.	55±15 gr-cm	——	——
Pressure of pressure roller.	350±50 gr	Pressure roller lever spring M93 (for Forward) M102 (for Reverse)	——

ALIGNMENT INSTRUCTIONS OF RADIO

DIAL CORD THREADING

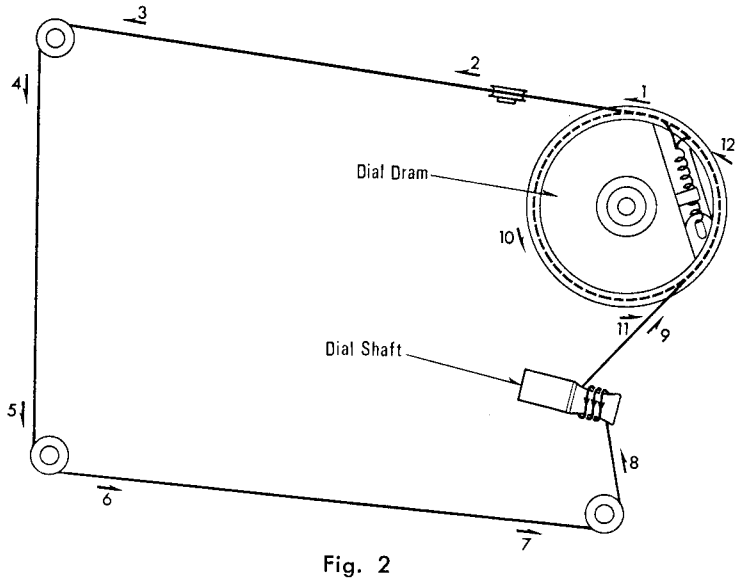


Fig. 2

AM, FM IF & RF ALIGNMENT

AM IF & RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set band selector to AM. Set balance control to center.
Set volume control to maximum. Maintain line voltage at 120 volts.
Set tone control to treble.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz (400 Hz Mod.)	Point of non-interference (on/about 600 kHz).	Output meter across EXT SP jack (L).	T4 (1st IFT) T6 (2nd IFT) T9 (3rd IFT) (fig. 9)	Adjust for maximum output.
2	Fashion loop of several turns of wire and radiate signal into loop of receiver.	550 kHz (400 Hz Mod.)	550 kHz	Output meter across EXT SP jack (L).	L6 (OSC coil) L5 (ANT coil) (fig. 9)	Adjust for maximum output by sliding coil (L5) along ferrite core.
3	Fashion loop of several turns of wire and radiate signal into loop of receiver.	1500 kHz (400 Hz Mod.)	1500 kHz	Output meter across EXT SP jack (L).	C32 (OSC trimmer) C26 (ANT trimmer) (fig. 8)	Adjust for maximum output. Repeat steps (2) and (3).

Note: 1. Seal antenna bobbin with wax after completing alignment.
2. Remove line cord antenna from FM external antenna terminal when aligning.
3. Make certain that speaker system or 8Ω dummy load is connected to the EXT SP jack when aligning.

FM IF & DETECTOR ALIGNMENT WITH OSCILLOSCOPE

EQUIPMENT REQUIRED

Signal generator that provides 10.7 MHz marker.
Sweep generator that provides 10.7 MHz center frequency and 400 kHz sweep width.

OSCILLOSCOPE

Set sweep selector of oscilloscope to external sweep. Apply 60 Hz sweep signal from sweep generator to horizontal input terminals of oscilloscope.
Set band selector to FM.
Set volume control to minimum.
Set tone control to treble.
Set balance control to center.
Set AFC switch to OFF.
Maintain line voltage at 120 volts.

Note: Unsolder lead between test point TP3 and point [A] before alignment, and resolder it after alignment.

	SWEEP GENERATOR COUPLING	SIGNAL GENERATOR COUPLING	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	High side thru. 0.001 μF to point TP2 (fig. 8). Common to chassis.	High side thru. 0.001 μF to point TP2 (fig. 8). Common to chassis.	Point of non-interference (on/about 90 MHz).	Connect vert. amp. of scope to point TP3 (fig. 9). Common to chassis.	T1 (FM 1st IFT) T2 (FM 1st IFT) T3 (FM 2nd IFT) T5 (FM 3rd IFT) T7 (FM 4th IFT) (fig. 8 & 9)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to fig. 3)
2	High side thru. 0.001 μF to point TP2 (fig. 8). Common to chassis.	High side thru. 0.001 μF to point TP2 (fig. 8). Common to chassis.	Point of non-interference (on/about 90 MHz).	Connect vert. amp. of scope to point TP4 (fig. 9). Common to chassis.	T8 (FM 4th IFT) (fig. 9)	Adjust T8 so that 10.7 MHz marker is at the center. (Refer to fig. 4)

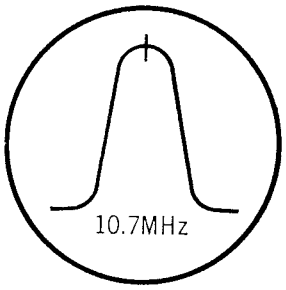


Fig. 3

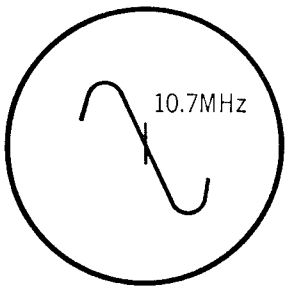
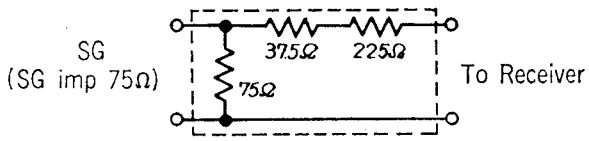


Fig. 4



FM Dummy Antenna

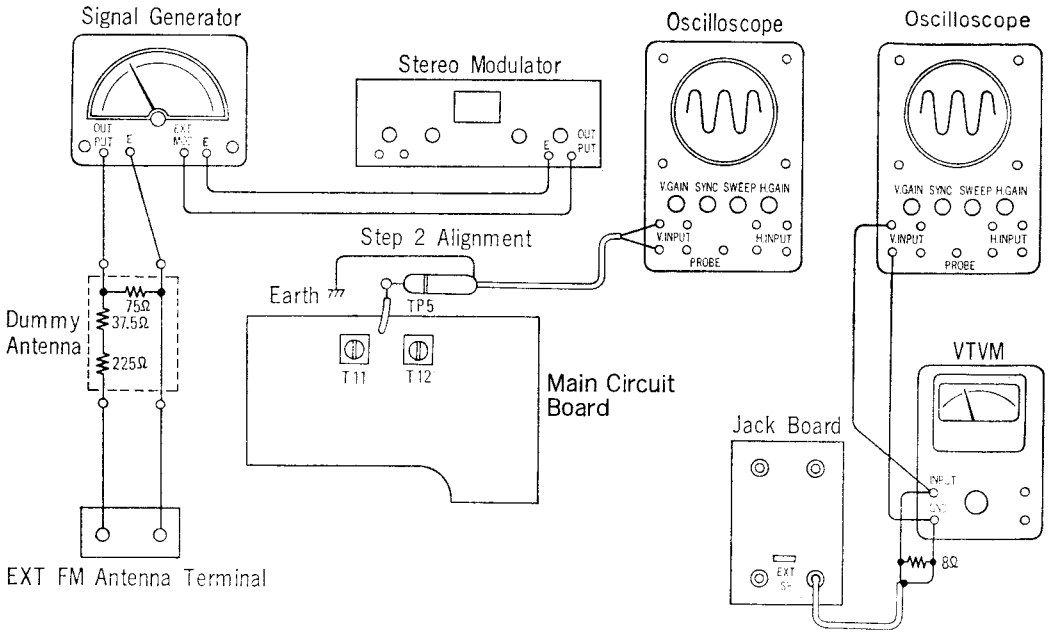
Fig. 5

FM RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set band selector to FM.
Set volume control to maximum.
Set tone control to treble.
Set balance control to center.
Set AFC switch to OFF.
Maintain line voltage at 120 volts.

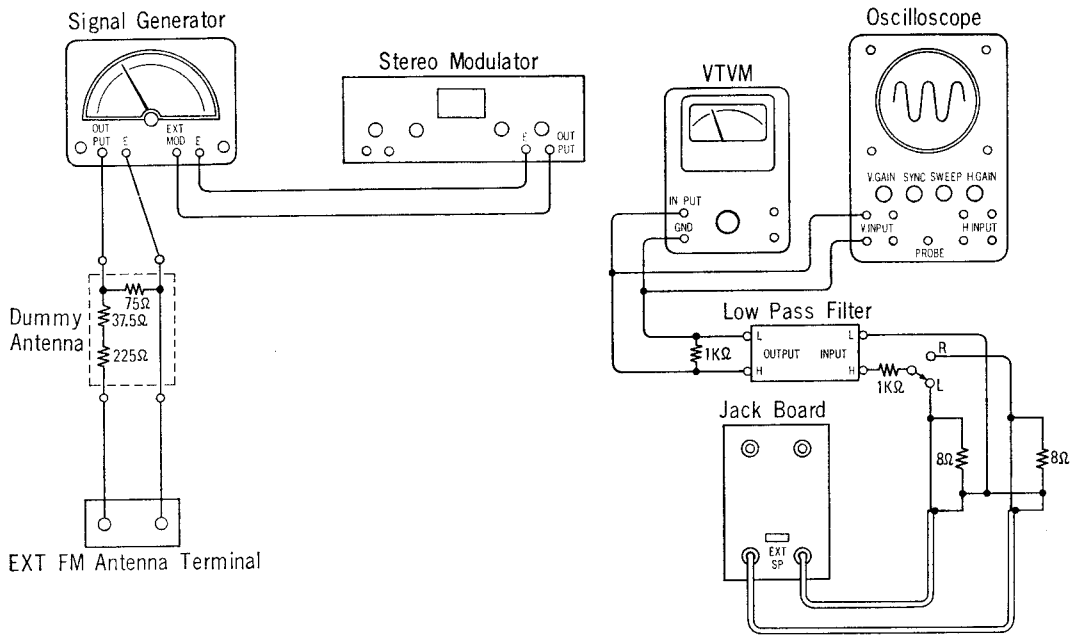
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
3	Connect to EXT FM antenna terminal through FM dummy antenna. Common to chassis. (Refer to fig. 5)	90 MHz (400 Hz Mod.)	90 MHz	Output meter across EXT SP jack (L).	L4 (FM OSC coil) L1 (FM ANT coil) L2 (FM collector coil) (Refer to fig. 8)	Adjust for maximum output.
4	Connect to EXT FM antenna terminal through FM dummy antenna. Common to chassis. (Refer to fig. 5)	106 MHz (400 Hz Mod.)	106 MHz	Output meter across EXT SP jack (L).	C17 (FM OSC trimmer) C1 (FM ANT trimmer) C8 (FM collector trimmer) (Refer to fig. 8)	Adjust for maximum output. Repeat steps (3) and (4).

Note: Three output responses will be present; proper tuning is the center frequency.



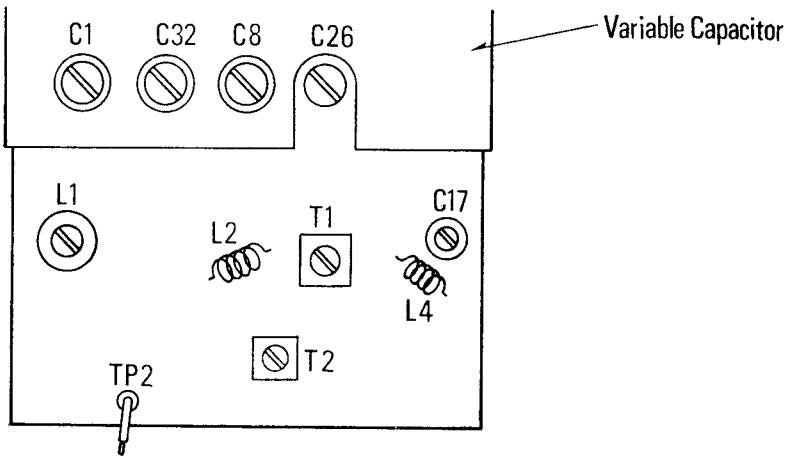
Recommended Equipment Connections for Multiplex Coil Alignment

Fig. 6



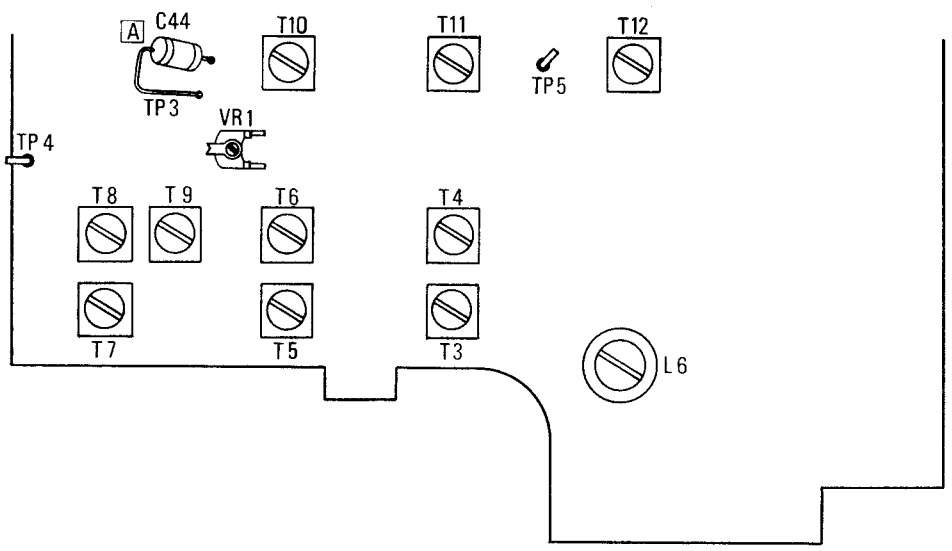
Recommended Equipment Connections for Separation Alignment

Fig. 7



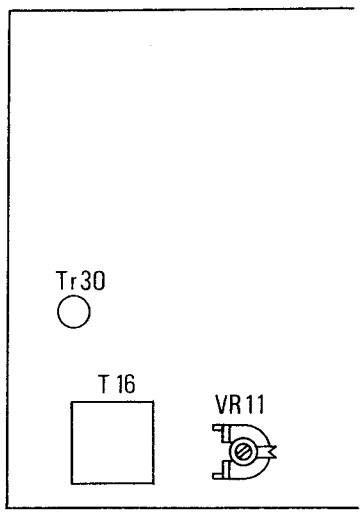
RF Circuit Board

Fig. 8



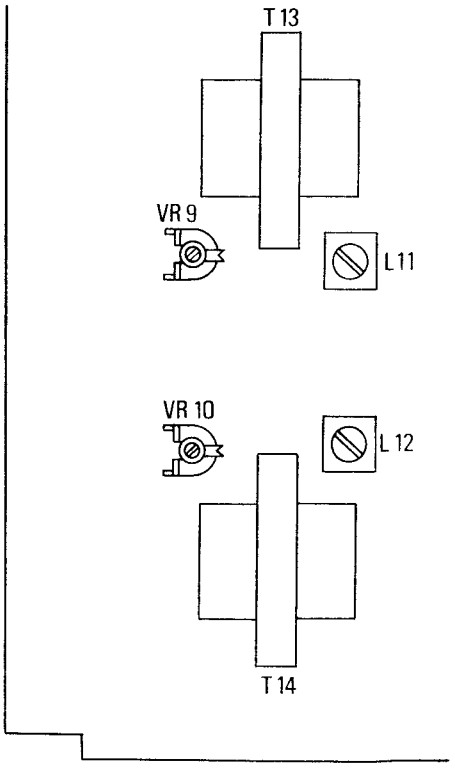
Main Circuit Board

Fig. 9



Power Circuit Board

Fig. 10



Main Circuit Board

Fig. 11

FM STEREO ALIGNMENT

MULTIPLEX COIL ALIGNMENT

Equipment required:

Stereo modulator ..... Connect stereo modulator output to EXT MOD. terminal of signal generator.
Signal generator..... Modulation rate of 19 kHz pilot signal ..... 8~10%
Output level ..... 60 dB
Frequency ..... Approx. 98 MHz
Oscilloscope
Dummy antenna
VTVM

Procedure:

Tuner..... Selector switch to FM STEREO, dial setting to approx. 98 MHz, AFC switch to OFF, tone control to TREBLE, balance control to CENTER, volume control to audible level of speaker sound.

SEPARATION ALIGNMENT

Equipment required:

Stereo modulator ..... Connect stereo modulator output to EXT MOD. terminal of signal generator.
Signal generator..... Modulation rate by 19 kHz pilot signal ..... 8~10%
Modulator rate by left signal 27%
Output level..... 60 dB
Oscilloscope
Dummy antenna
VTVM
Low pass filter

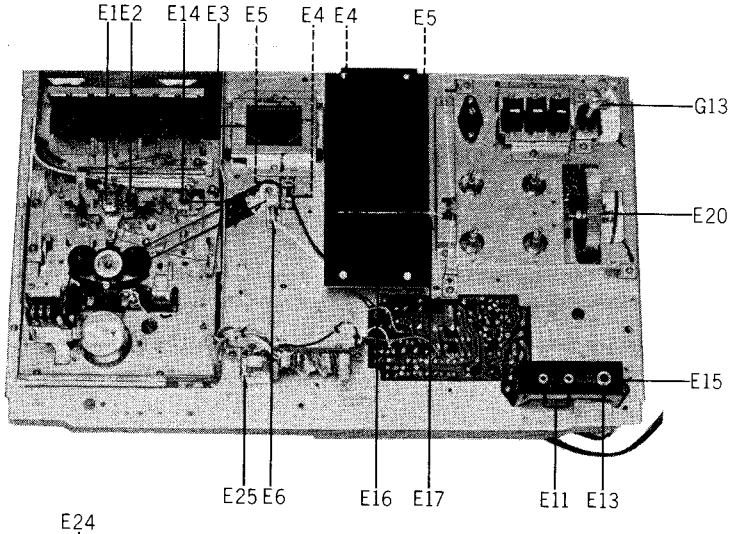
Procedure:

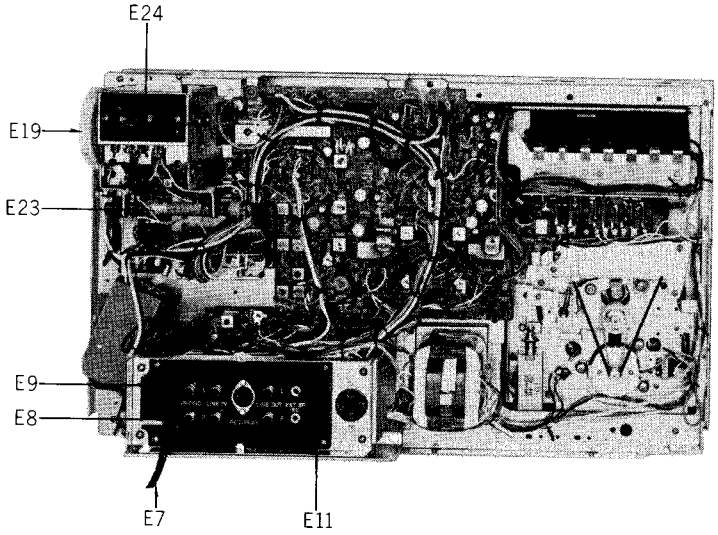
Tuner..... Selector switch to FM STEREO, dial setting to approx. 98 MHz, AFC switch to OFF, tone control to TREBLE, balance control to CENTER. Adjust volume control so that output levels from both units becomes equal.

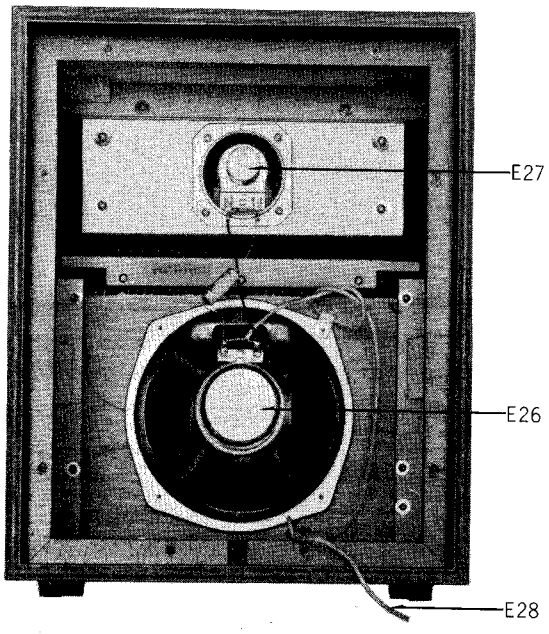
	ITEM	SIGNAL SOURCE CNNECTION	EQUIPMENT CONNECTION	ADJUSTMENT	REMARKS
1	Adjustment of pilot signal.	98 MHz, 30 dB (fig. 6)	TP5 (fig. 9)	T10 T11 T12 (fig. 9)	* Set stereo (L+R) modulation to zero. * Measure pilot signal only, and adjust for maximum.
2	Adjustment of separation.	98 MHz, 60 dB modulation by L signal. (fig. 7)	Connect VTVM and 8Ω resistor to EXT SP jack. (fig. 7)	T10 VR1 (fig. 9)	* Adjust VR control so that CH1 output becomes 0.63 V. * Slightly adjust T10 so that this output becomes maximum. * Then change the modulation by R signal only, and adjust semi-fixed volume VR1 so that CH1 output becomes minimum. * Likewise modulate by L signal only, and adjust VR1 so that CH2 output becomes minimum.
3	Measurement of stereo eye lighting level.	98 MHz (fig. 6)	——	——	* Adjust output of signal generator, and make sure that stereo eye lights at 13~30 dB.

Note: When aligning, remove line cord antenna attached to external FM antenna terminal.

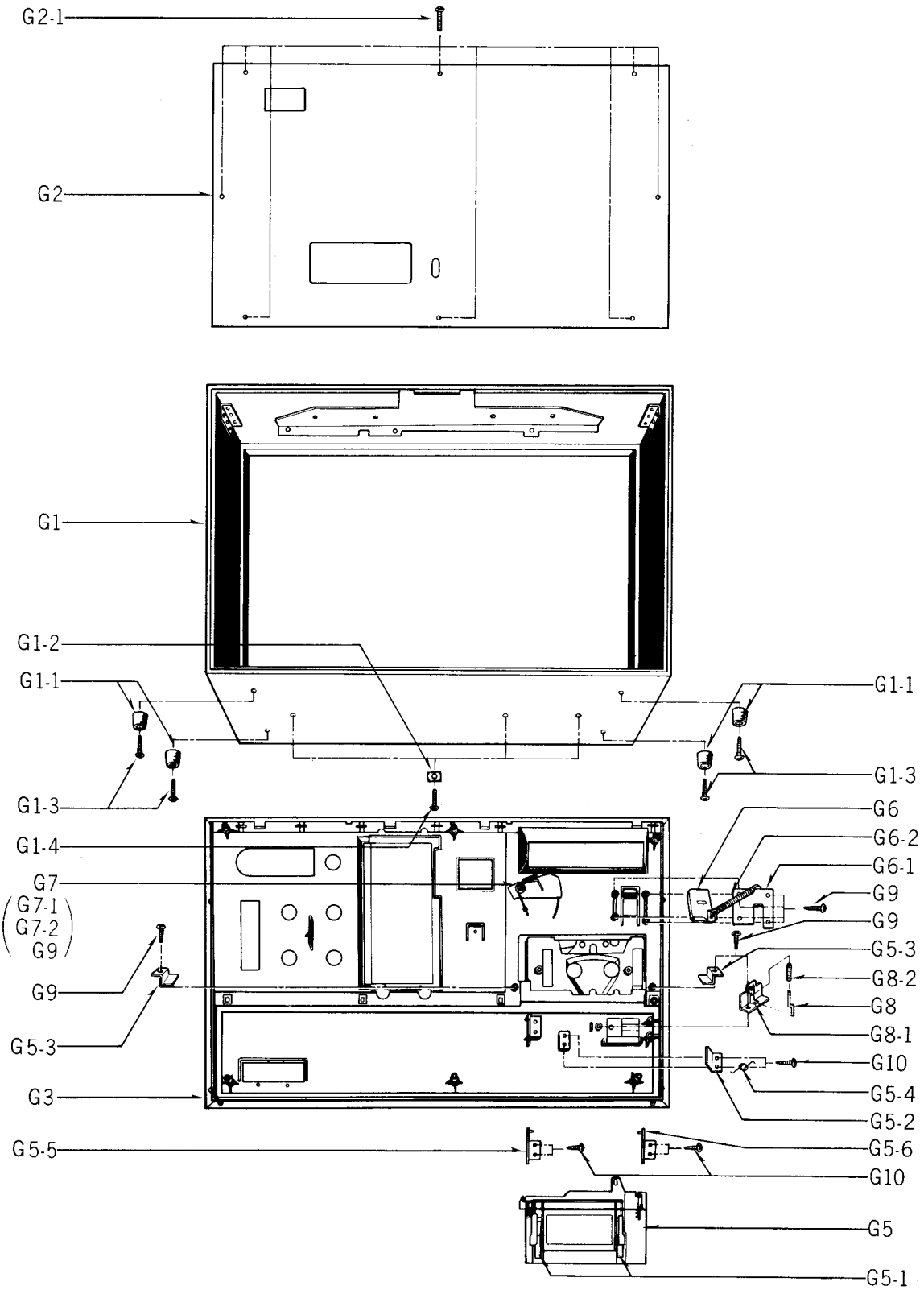
ELECTRICAL PARTS LOCATION

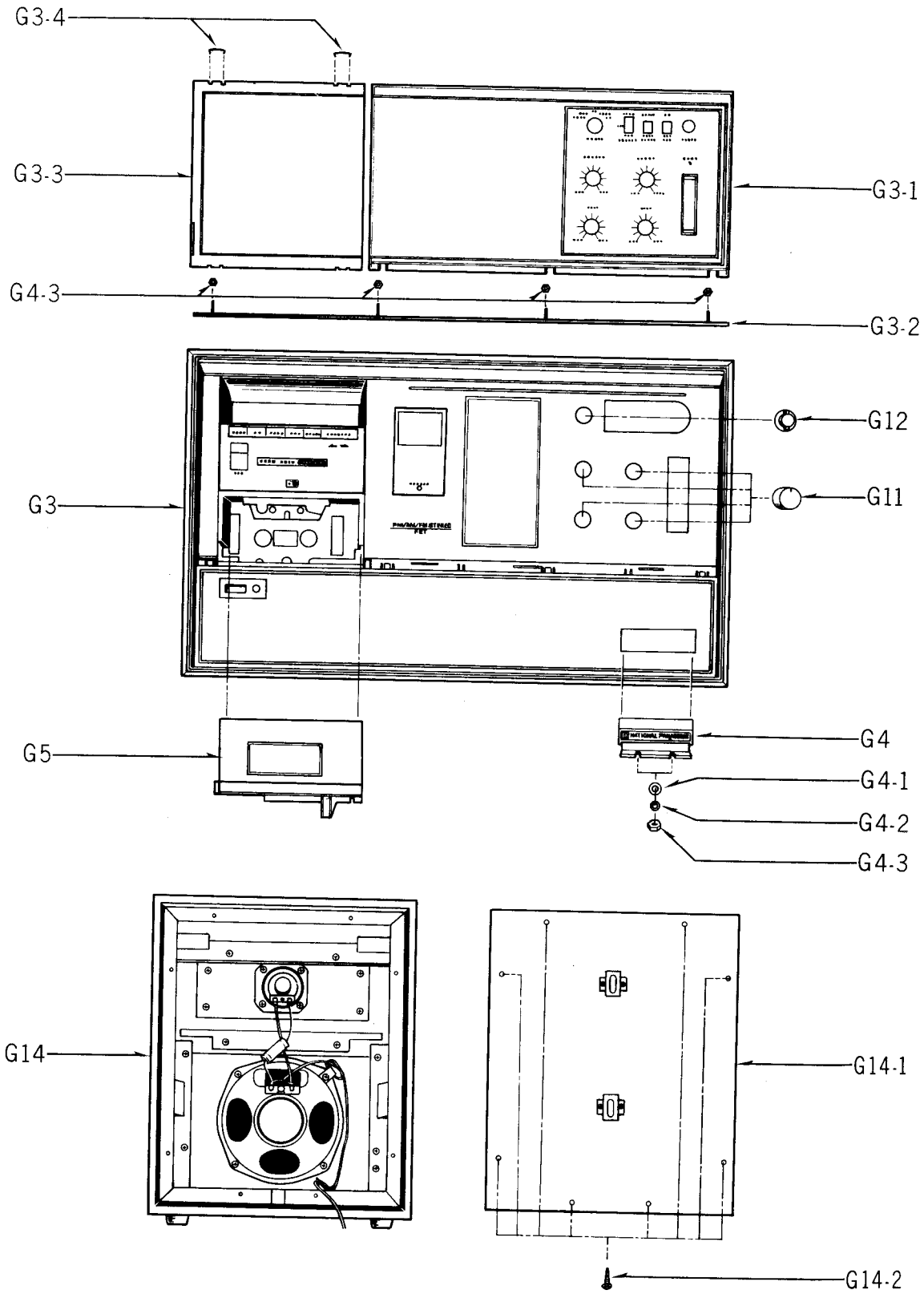




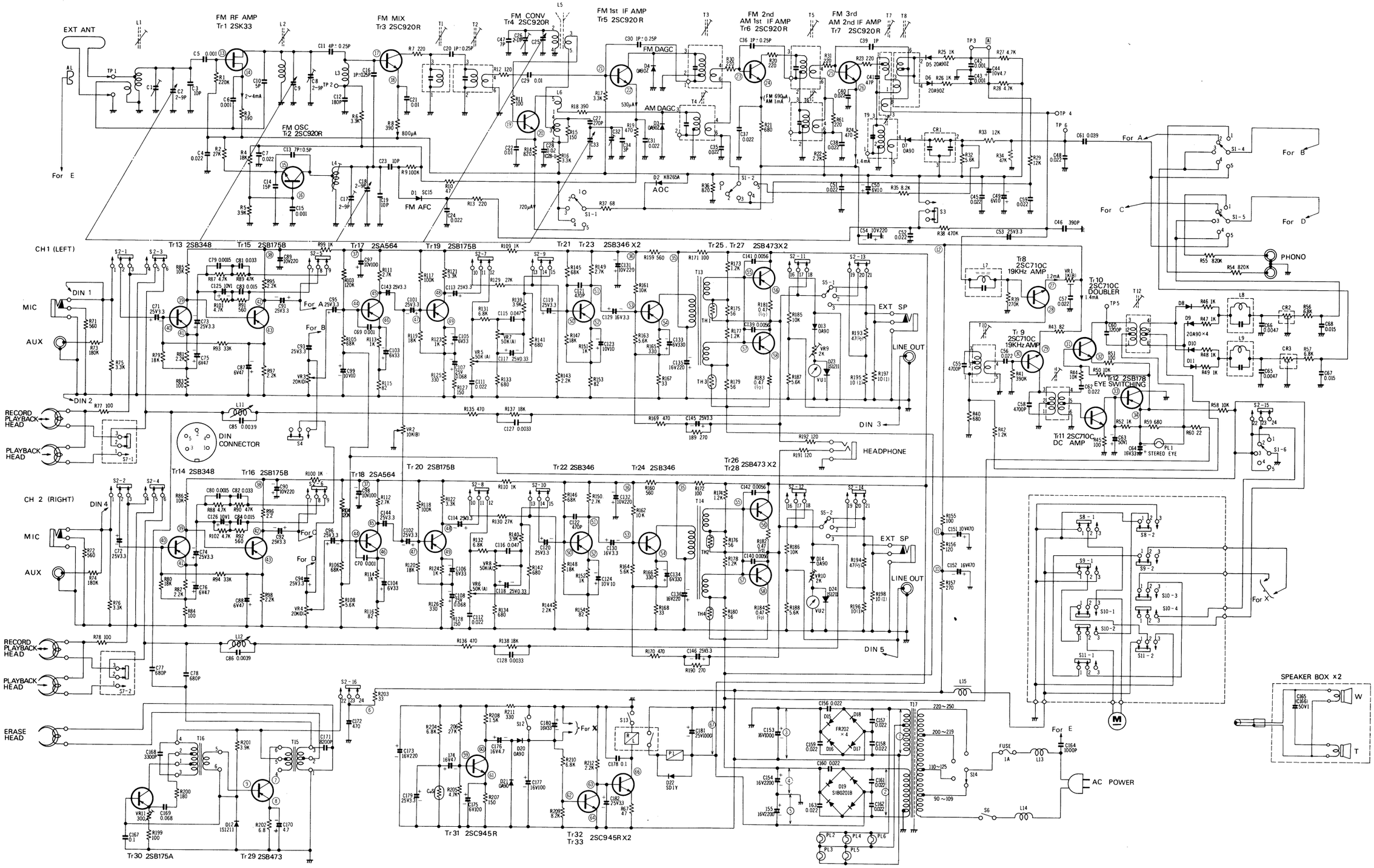


CABINET PARTS




G3-4
G3-3
G3-1
G4-3
G3-2
G12
G3
G11
G5
G4
G4-1
G4-2
G4-3
G14
G14-1
G14-2

SCHEMATIC DIAGRAM MODEL RS-282S



Check Point	PHONO
①	AC 12
②	AC 16.2
③	−15.3
④	+10.6
⑤	+10.6
⑥	−17.0
⑦	
⑧	
⑨	
⑩	−11.5
⑪	−10.8
⑫	−9.8
⑬	
⑭	
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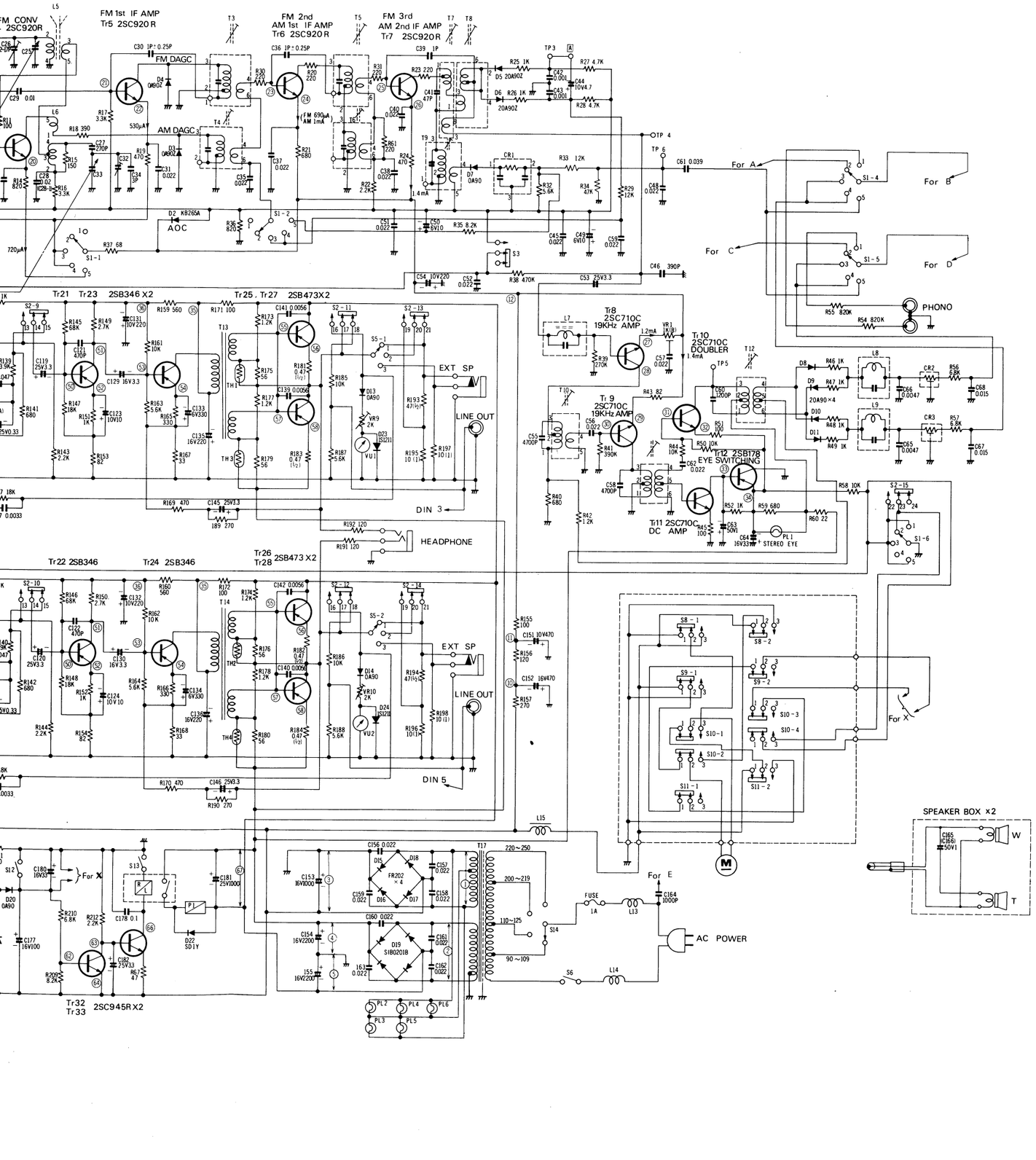
NOTE: All m
Use

NOTE:

1. S1-1~S1-5 ...
2. S2-1~S2-16 ...
3. S3 .....
4. S4 .....
5. S5-1, S5-2 ...
6. S6 .....
7. S7-1, S7-2 ...
8. S8-1, S8-2 ...
9. S9-1, S9-2 ...
10. S10-1~S10-4
11. S11-1, S11-2
12. S12 .....

282S



STANDARD VOLTAGE CHART

Check Point	PHONO	Playback	Recording	FM	FM ST	AM	Check Point	PHONO	Playback	Recording	FM	FM ST	AM
①	AC 12 V	AC 12 V	AC 11.5 V	AC 12 V	AC 12 V	AC 12 V	㉞				+10.6 V	+10.6 V	
②	AC 16.2 V	AC 16.2 V	AC 16.0 V	AC 16.2 V	AC 16.2 V	AC 16.2 V	㉟	−9.4 V	−9.4 V				
③	−15.3 V	−15.3 V	−14.3 V	−15.3 V	−15.3 V	−15.3 V	㊱	−7.1 V	−7.0 V				
④	+10.6 V	+10.6 V	+10.5 V	+10.6 V	+10.6 V	+10.6 V	㊲	−4.7 V	−4.7 V				
⑤	+10.6 V	+10.6 V	+10.5 V	+10.6 V	+10.6 V	+10.6 V	㊳	−3.8 V	−3.8 V				
⑥	−17.0 V	−17.0 V	−14.0 V	−17.0 V	−17.0 V	−17.0 V	㊴		−1.74 V				
⑦			−14.2 V				㊵		−0.54 V				
⑧			−0.47 V				㊶		−0.46 V				
⑨			−1.35 V				㊷		−2.09 V				
⑩	−11.5 V	−11.5 V	−11.0 V	−10.8 V	−10.8 V	−11.5 V	㊸		−1.61 V				
⑪	−10.8 V	−10.8 V	−10.8 V	−8.8 V	−8.8 V	−9.8 V	㊹	−1.58 V	−1.58 V				
⑫	−9.8 V	−9.8 V	−9.5 V	−7.2 V	−7.2 V	−8.4 V	㊺	−2.35 V	−2.35 V				
⑬				−6.4 V	−6.4 V		㊻	−0.94 V	−0.94 V				
⑭				−5.8 V	−5.8 V		㊼	−0.82 V	−0.82 V				
⑮				−1.67 V	−1.67 V		㊽	−3.0 V	−3.0 V				
⑯				−1.17 V	−1.17 V		㊾	−0.7 V	−0.7 V				
⑰				−5.9 V	−5.9 V		㊿	−1.52 V	−1.52 V				
⑱				−6.4 V	−6.4 V		(51)	−3.45 V	−3.45 V				
⑲						−7.0 V	(52)	−1.45 V	−1.45 V				
⑳						−7.6 V	(53)	−2.55 V	−2.55 V				
㉑				−5.9 V	−5.9 V		(54)	−2.42 V	−2.42 V				
㉒				−6.6 V	−6.6 V		(55)	−0.15 V	−0.15 V				
㉓				−6.05 V	−6.05 V	−6.8 V	(56)	+0.005 V	+0.005 V				
㉔				−6.85 V	−6.85 V	−7.55 V	(57)	+10.5 V	+10.5 V				
㉕				−5.9 V	−5.9 V	−6.95 V	(58)	+10.6 V	+10.6 V				
㉖				−6.6 V	−6.6 V	−7.7 V	(59)	−14.8 V	−14.8 V				
㉗				−6.6 V	−6.6 V		(60)	−10 V	−10 V				
㉘				−0.46 V	−0.46 V		(61)	−15.0 V	−15.0 V				
㉙				−7.1 V	−7.1 V		(62)	−15.0 V	−15.0 V				
㉚				−6.4 V	−6.4 V		(63)	−15.8 V	−15.8 V				
㉛				+10.6 V	+10.6 V		(64)	−15.8 V	−15.8 V				
㉜				+10.6 V	+10.6 V		(66)	−15.8 V	−15.8 V				
㉝				+10.6 V	+10.6 V		(67)	−23.2 V	−23.2 V				

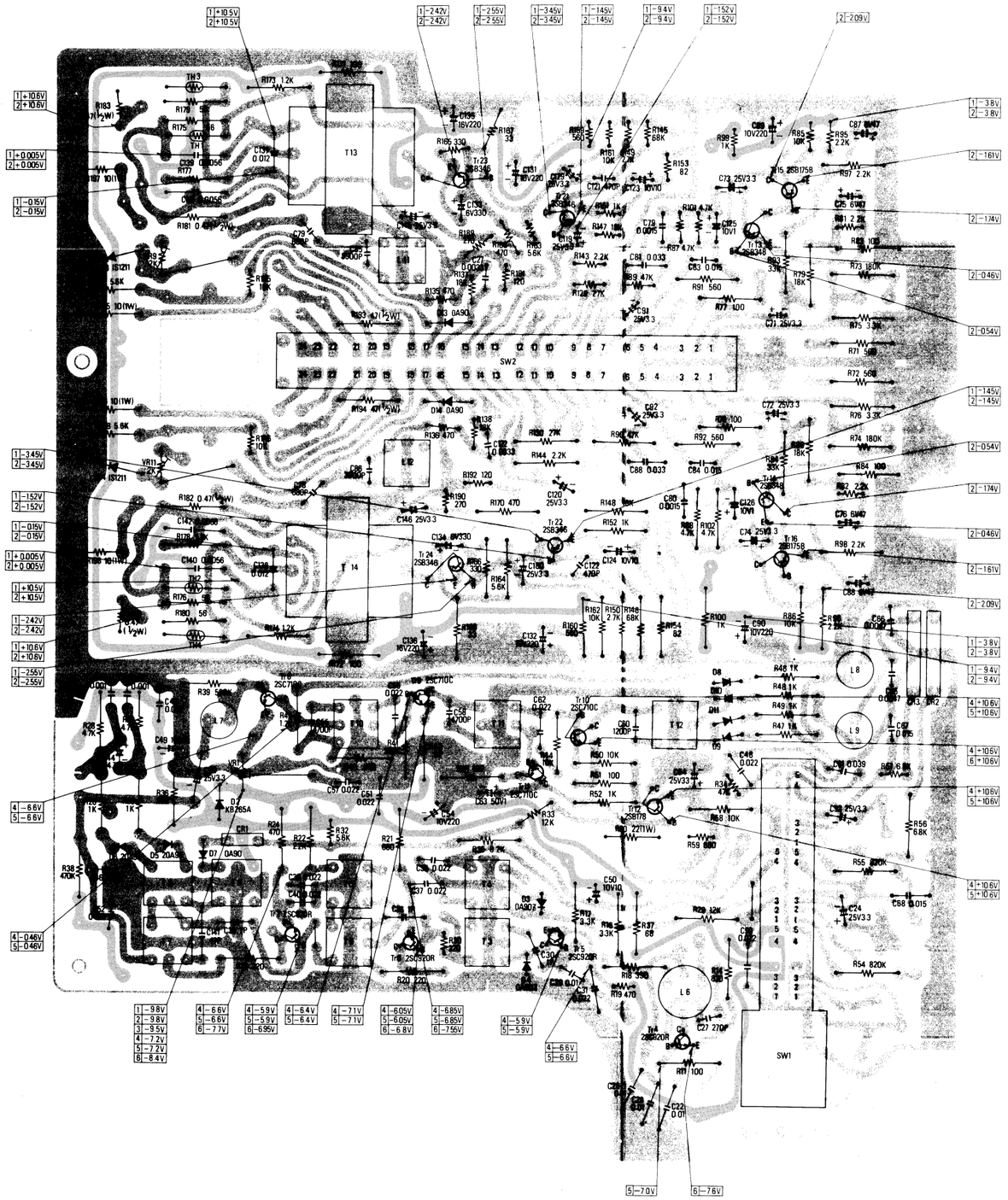
NOTE: All measurements are under no signal with volume at minimum position.
Use M-type VTVM for AC voltage measurement and P-type VTVM for DC voltage measurement.

NOTE:

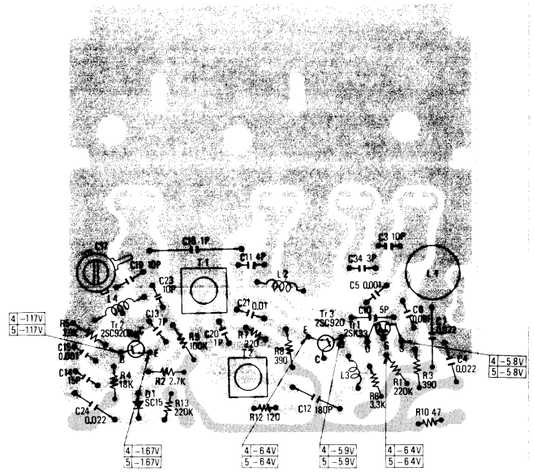
1. S1-1～S1-5 ..... Function switch (shown in TAPE position).
   1...PHONO, 2...TAPE, 3...FM, 4...FM STEREO, 5...AM.
2. S2-1～S2-16 ..... Record/playback select switch (shown in PLAYBACK position).
3. S3 ..... Automatic frequency control switch.
4. S4 ..... STEREO/MONO select switch.
5. S5-1, S5-2 ..... Monitor switch.
   1...HIGH, 2...LOW, 3...OFF.
6. S6 ..... Power switch.
7. S7-1, S7-2 ..... Reverse switch coupled with S8.
8. S8-1, S8-2 ..... Forward switch coupled with S7.
9. S9-1, S9-2 ..... Fast reverse switch.
10. S10-1～S10-4 ... Play switch.
11. S11-1, S11-2 ..... Fast forward switch.
12. S12 ..... Plunger cut switch coupled with S8, S9 (shown in OFF position).
13. S13 ..... Plunger cut switch (shown in OFF position).
14. S14 ..... AC voltage select switch.
15. VR1..... Separation adjustment VR.
16. VR2..... Balance control.
17. VR3, VR4 ..... Volume control.
18. VR5, VR6 ..... Bass control.
19. VR7, VR8 ..... Treble control.
20. VR9, VR10 ..... Level indicator adjustment VR.
21. VR11 ..... Erase current adjustment VR.
22. Resistor are ohms (Ω), 1/4 watt unless specified otherwise.
    K=1,000Ω, M=1,000,000Ω.
    The bracket numbers followed the resistors show the wattage of the resistor.
23. Capacitors are microfarads (μF) unless specified otherwise.
    P=Micro-microfarads.
24. Encircled numbers (◯) show the checkpoints for voltage.
    The values are marked in the standard voltage chart.

CIRCUIT BOARD

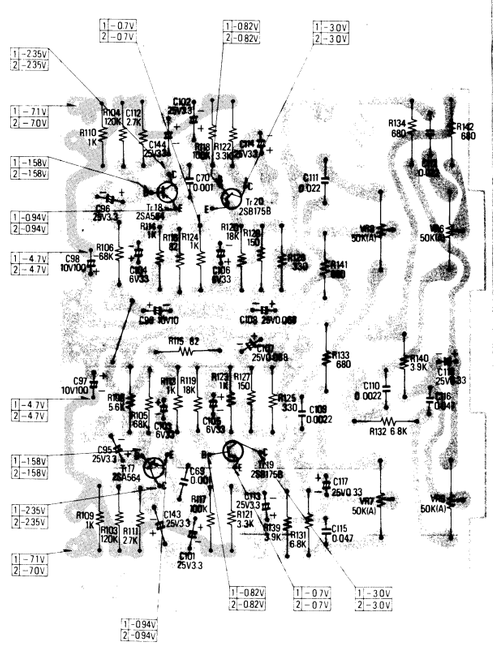
MAIN CIRCUIT BOARD



RF CIRCUIT BOARD



TONE CONTROL CIRCUIT BOARD



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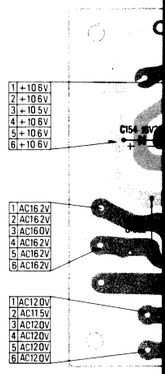

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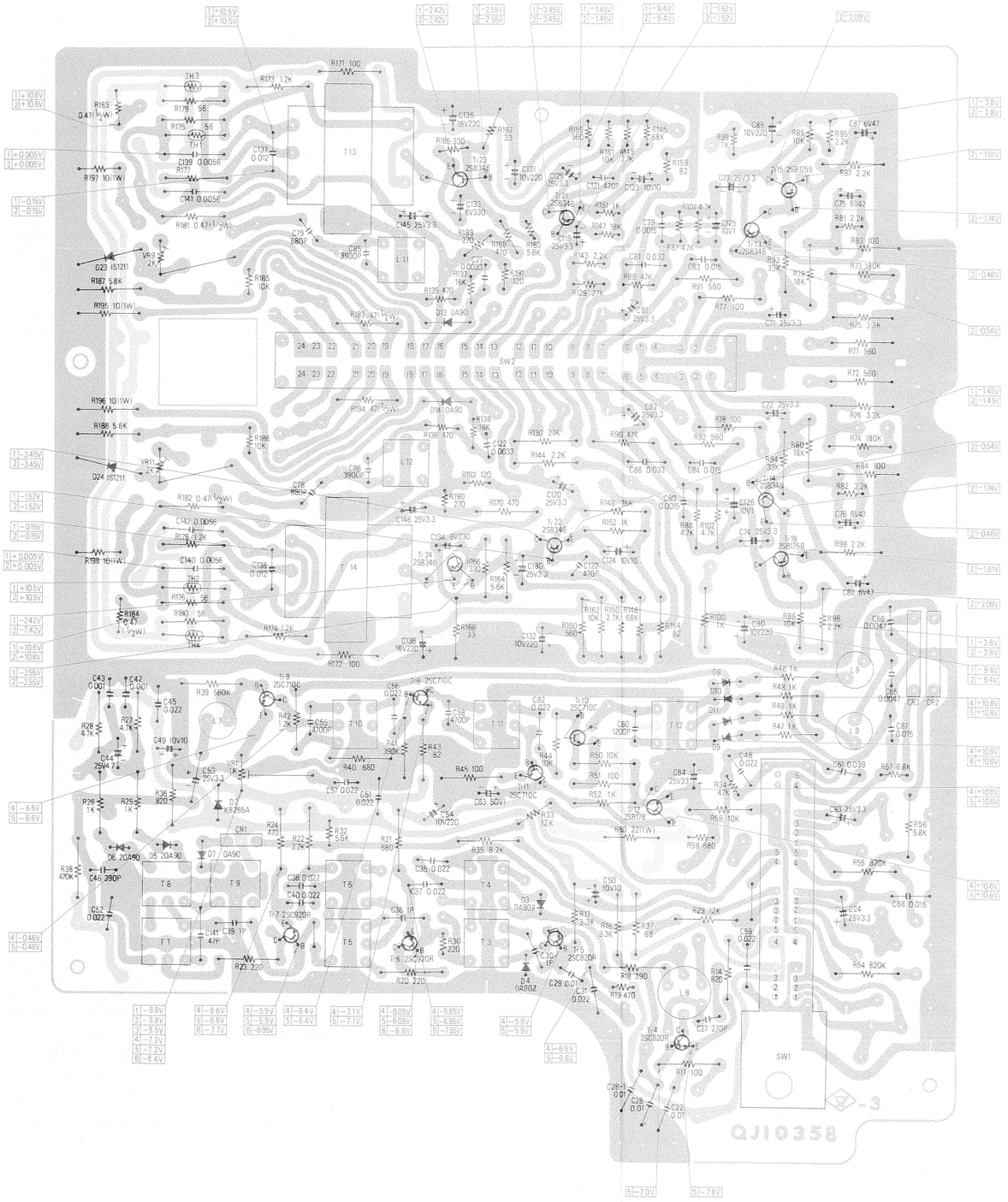
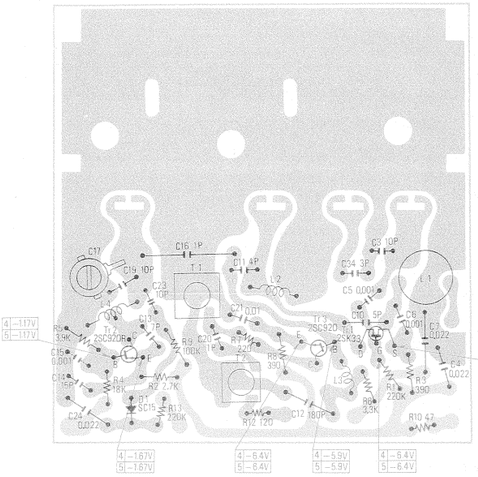
CIRCUIT BOARD

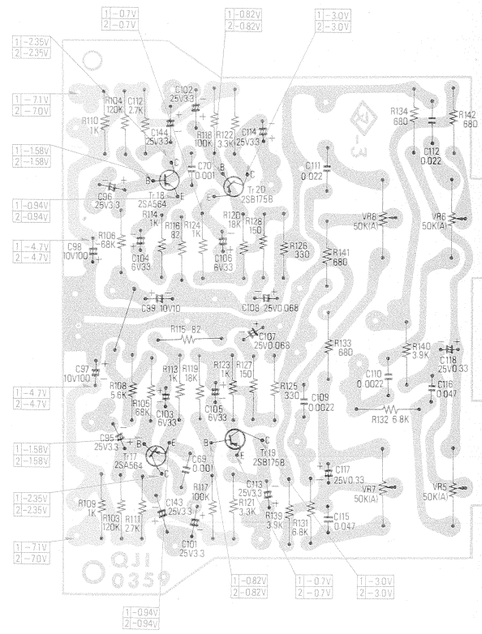
MAIN CIRCUIT BOARD



RF CIRCUIT BOARD



TONE CONTROL CIRCUIT BOARD



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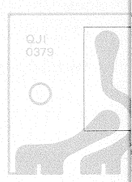

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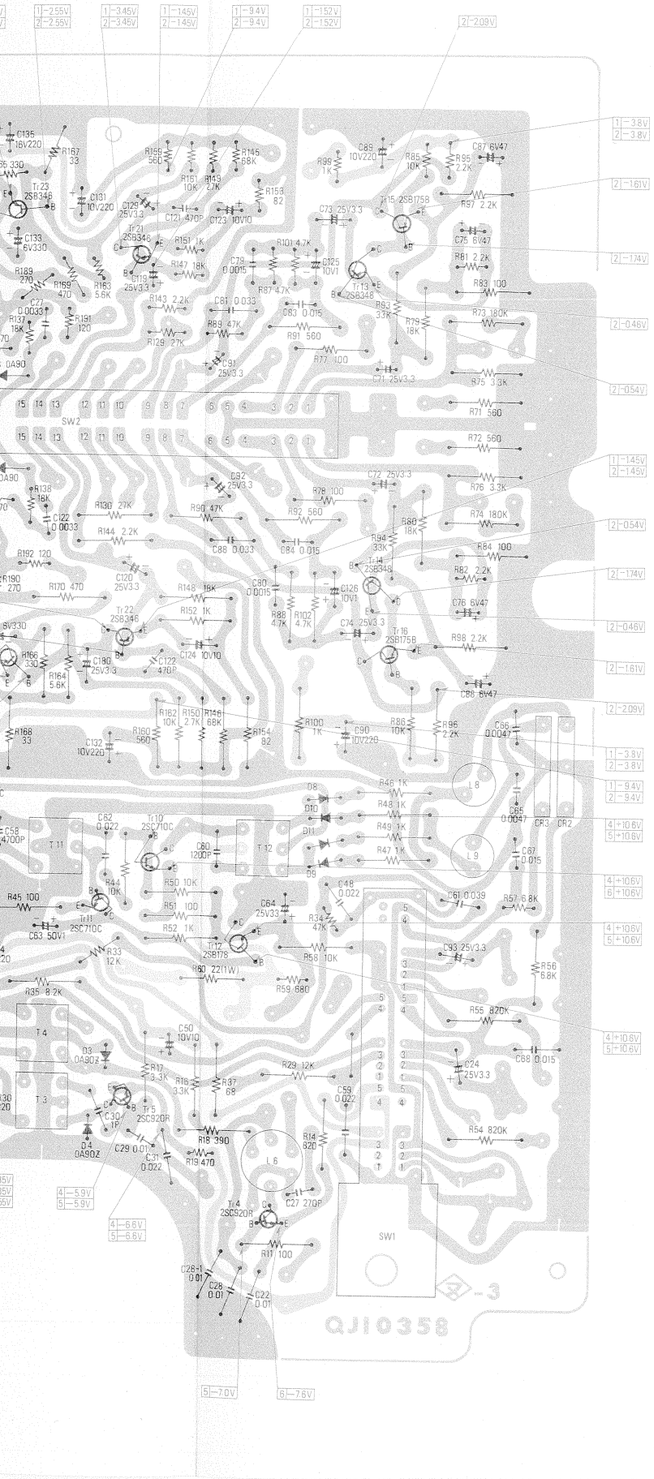
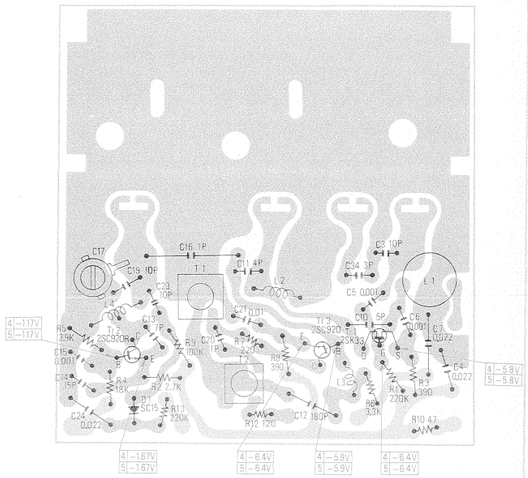
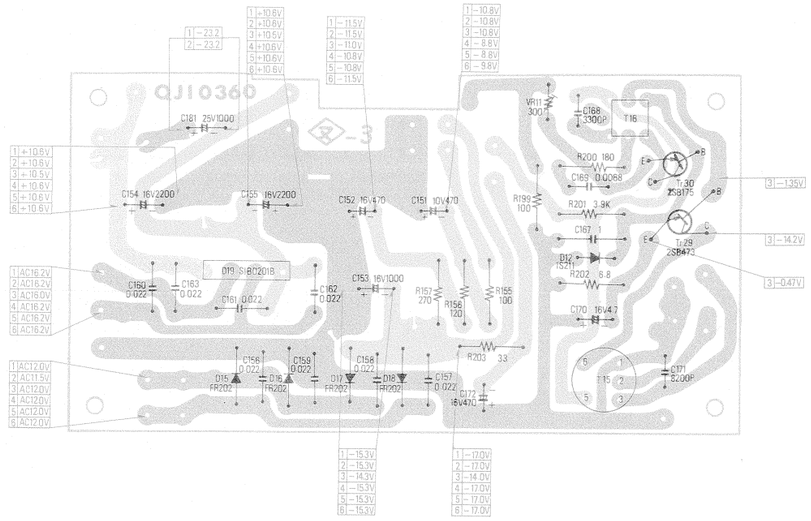


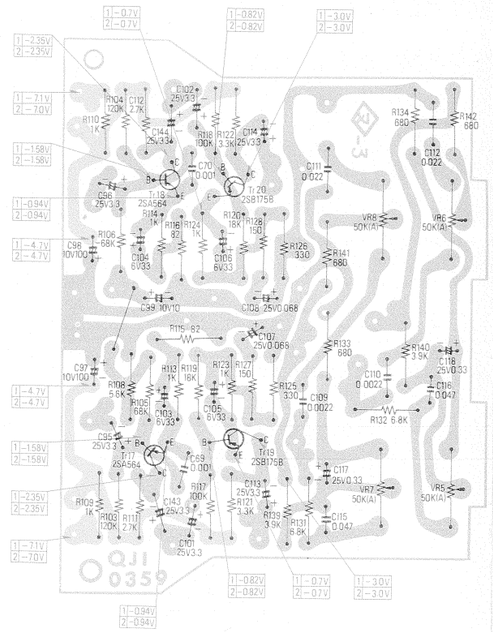
RF CIRCUIT BOARD



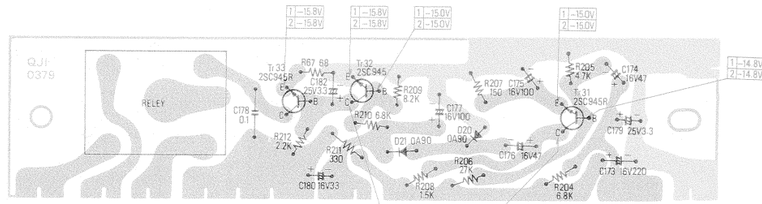
POWER CIRCUIT BOARD



TONE CONTROL CIRCUIT BOARD

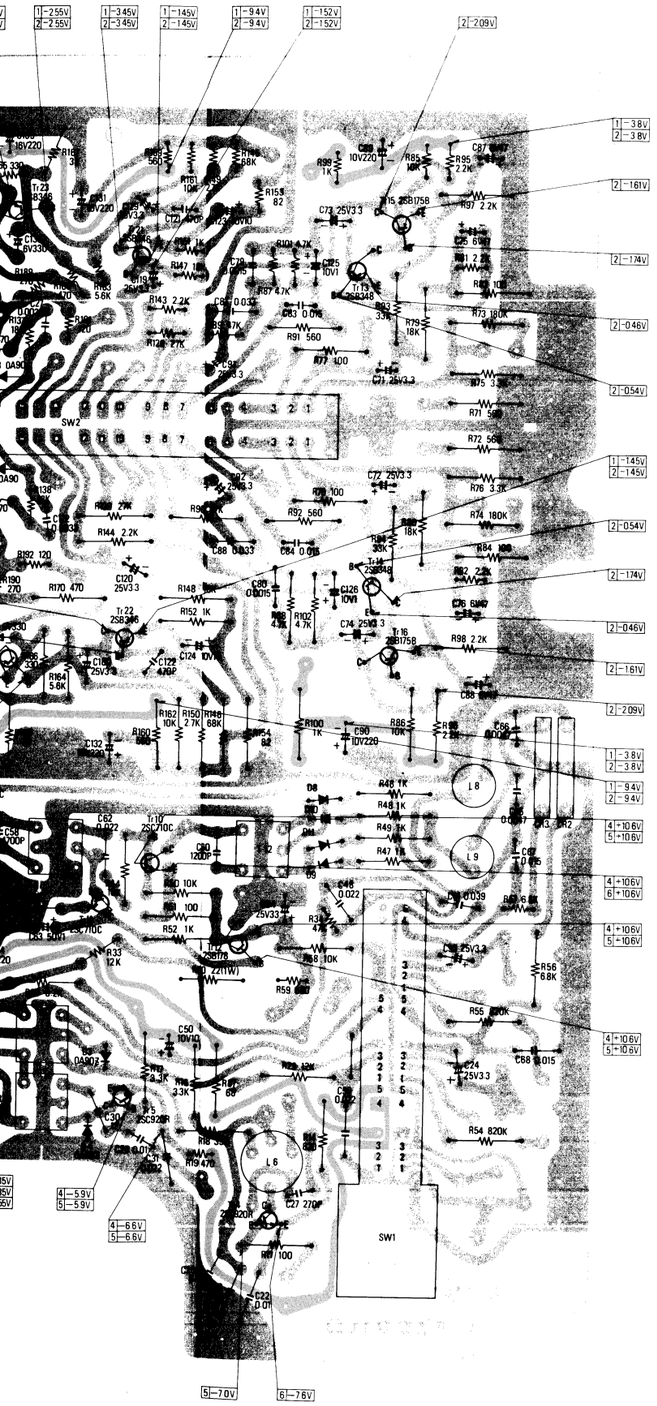


AUTO STOP CIRCUIT BOARD



NOTE:

The circuit shown in green on the conductor is +B circuit.
The circuit shown in red on the conductor is −B circuit.
Values indicated in ☐ are DC voltages between the chassis and electrical parts.
Numerals show values of voltage at.....
1...Phono, 2...Playback, 3...Recording, 4...FM, 5...FM stereo, and 6...AM respectively.



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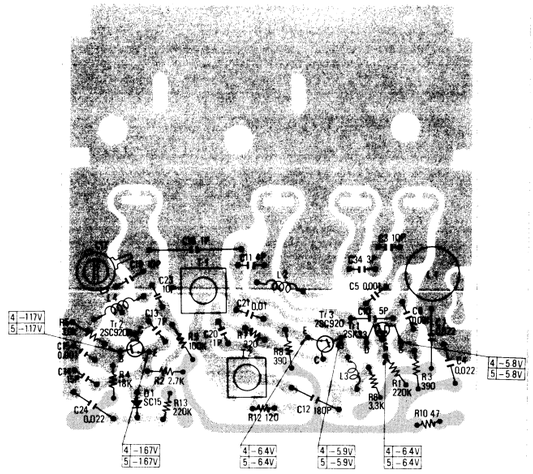

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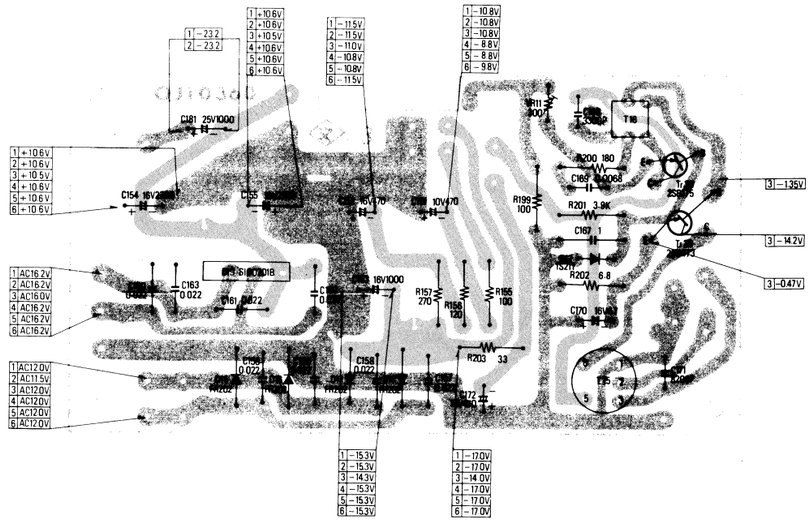

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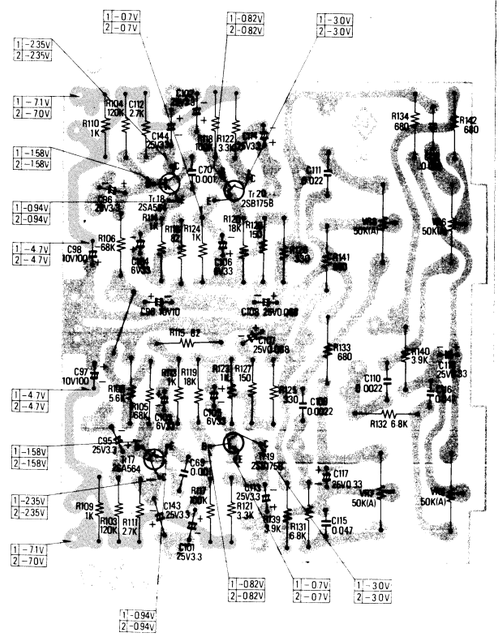

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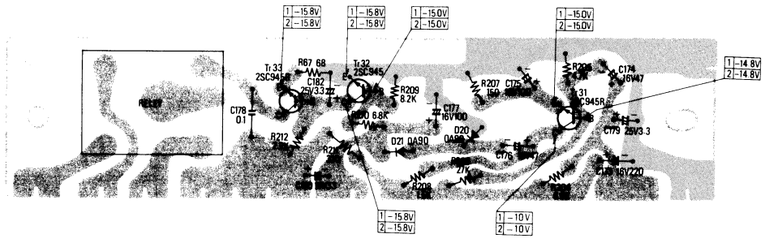

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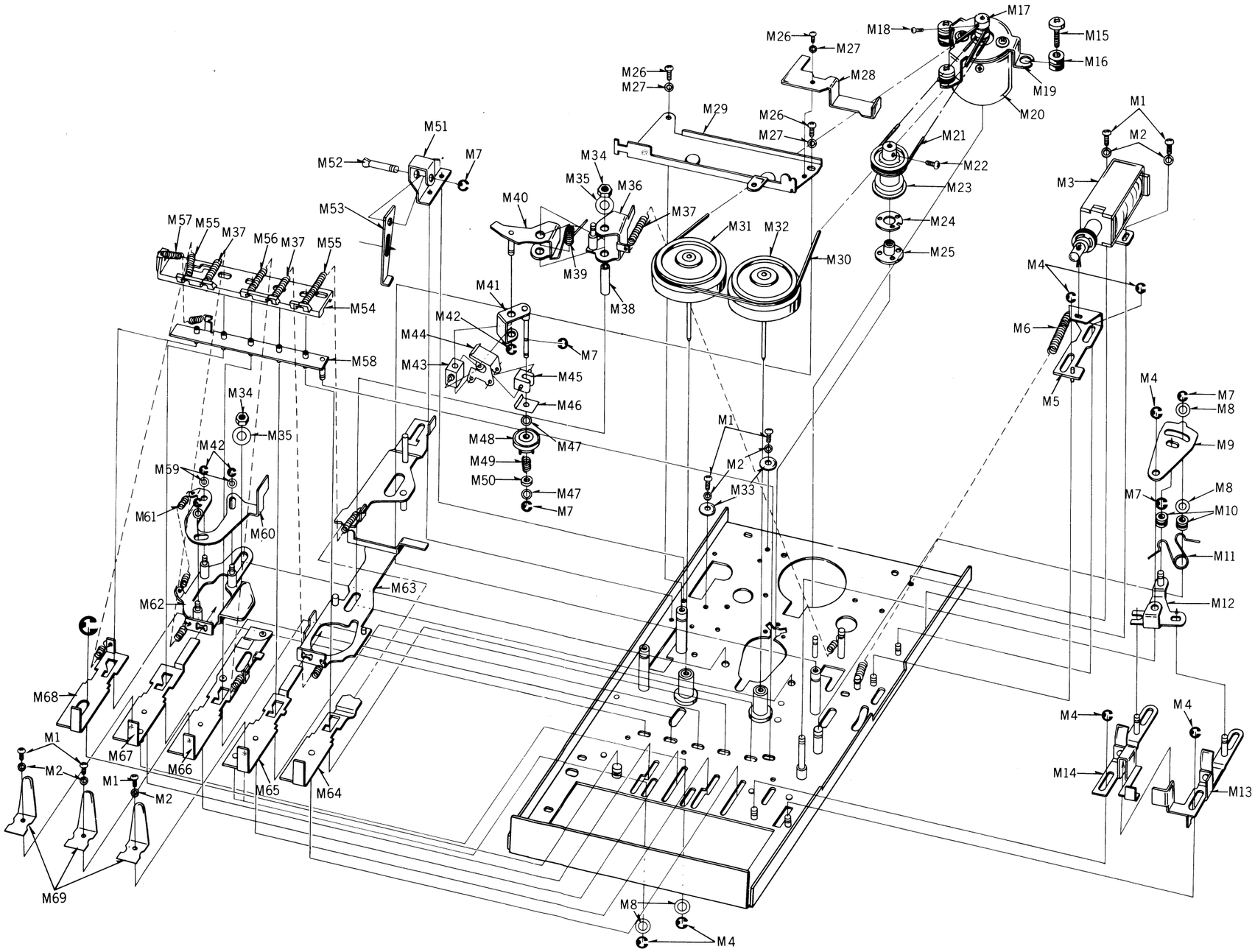
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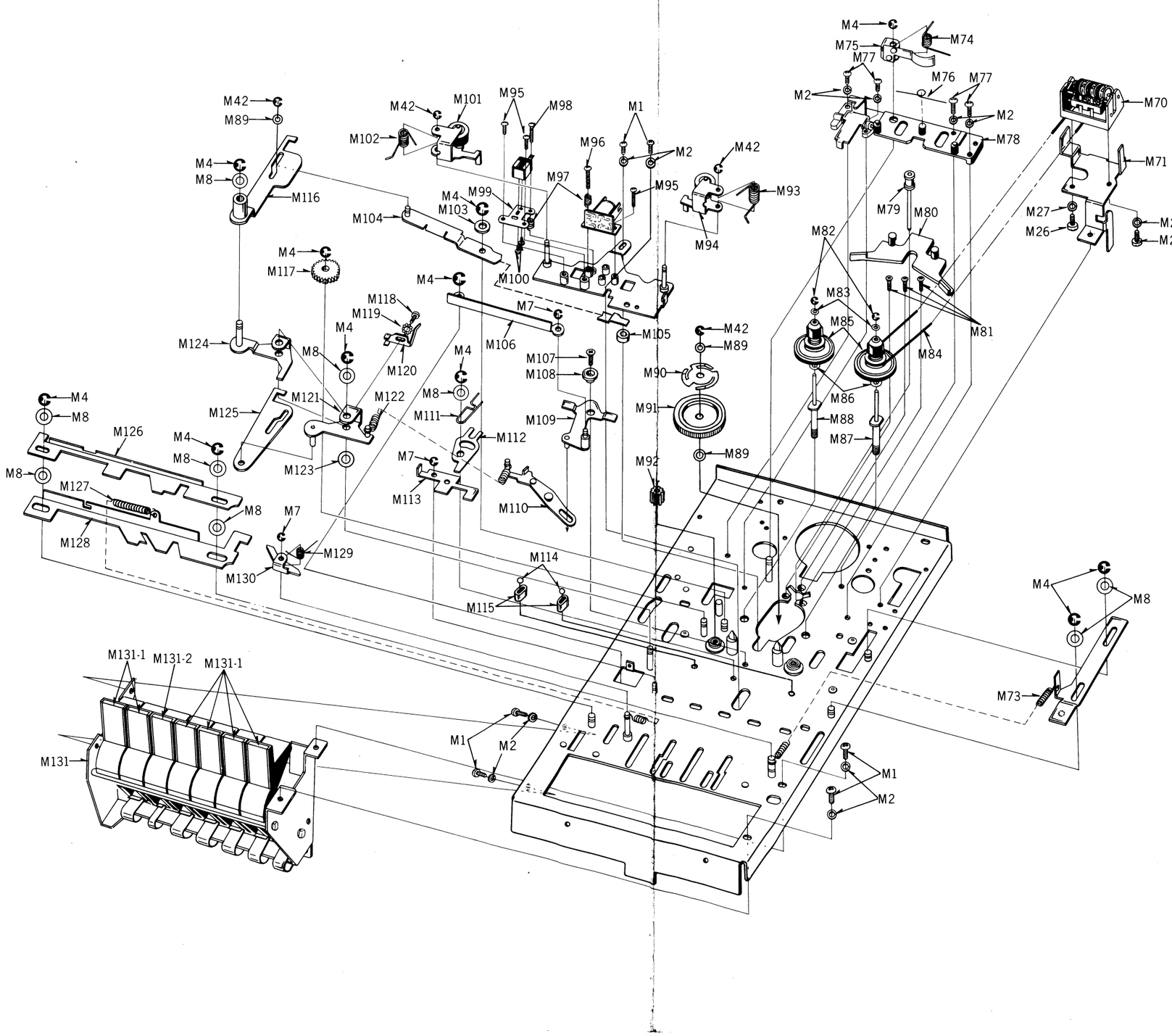
EXPLODED VIEWS



ORDER NO. ARD-7509101M

Service Manual

Modification Report

Date. Sep. 30, 1975 | No. MN-329

TAPE RECORDER

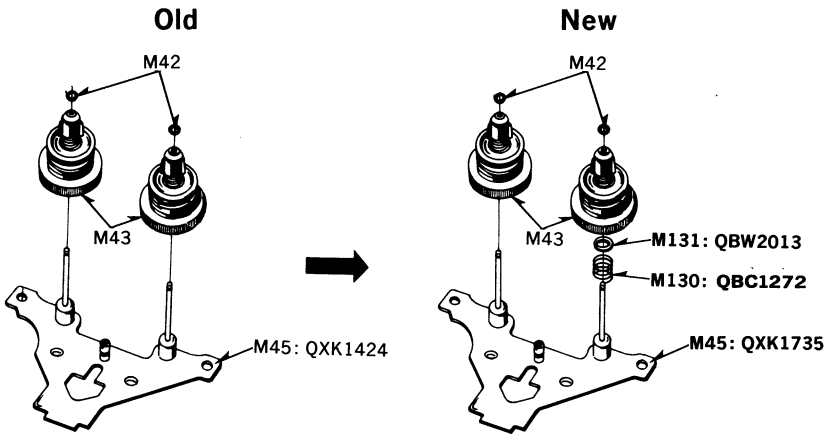
Model No. RS-283S

SUBJECT: Employment of back tension spring

In order to stabilize tape movement, a spring system is employed for applying back tension to the supply reel table.

MODIFICATION:

Ref. No.	Description	Part No.		Remarks
		Old	New	
M45	Reel Table Base Plate	QXK1424	QXK1735	
M130	Back Tension Spring	—	QBC1272	Added
M131	Washer	—	QBW2013	〃



INTERCHANGEABILITY:

Old and new parts are not interchangeable individualy, but when changing these parts together listed above, they are mutually interchangeable.

CHANGEOVER:

From the production of July, 1975 (From serial No. RG5···onward).

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Printed in Japan